Molecular Biology Research Communications 2021;10(2):63-71 DOI:10.22099/mbrc.2021.38845.1566 MBRC
Original Article Open Access

Cloning and expressing of interleukine 2 in amniotic membrane-derived mesenchymal stem cells, as a potent feeder layer

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ABSTRACT

The application of mesenchymal stem cells (MSCs) is rapidly expanding due to their unique properties in cell therapy, especially as the feeder layer in the *ex-vivo* expansion of immune cells. Also, Interleukin 2 (IL-2) is an essential human cytokine in the expansion of hematopoietic precursors and progenitors, i.e., NK cells and T cells, while there is no endogenous expression of IL-2 in MSCs. This study aimed to examine the potency of amniotic membrane (AM)-MSCs as the IL-2 secretory cells. *IL-2*-containing pCMV3-C-GFPspark shuttle vector was transformed in *E.coli DH5-alpha.* After cloning, the plasmid DNA was extracted and transfected in isolated AM-MSCs, by lipofectamine-2000. Then, the RNA and protein expression levels of exogenous IL-2 were evaluated 3 to 15 days after transfection, using ELISA and qRT-PCR. Fluorescent microscopy and flowcytometry assays were used for evaluating the GFP-positivity of transfected AM-MSCs, as IL-2 expression control. There was a significant increase in RNA expression of exogenous IL-2 in transfected AM-MSCs in 3 to 15 days after transfection. ($p<0.001$) Also, IL-2 concentration released in the medium was increased in 3rd day after transfection (611 pg/ml). However, the RNA and protein expression of IL-2 was reduced through passing the time. The results show AM-MSC is a suitable host for the expression and secretion of IL-2 as a critical cytokine in the *ex-vivo* expansion of hematopoietic precursors and progenitors, i.e., NK cells and T cells. Also, the survival time of IL-2 expression in AM-MSCs was long enough for use as a feeder layer.

Keywords: Interleukin-2; Mesenchymal stem cells; Plasmids; Transfection

INTRODUCTION

Cell therapy is a novel approach to cellular replacement or amplification aimed at tissue regeneration or restores lost functions [1]. Cellular immunotherapy is a high-tech medication

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pISSN 2322-181X eISSN 2345-2005